Remarks

In the above captioned Office Action claims 1-43 and 56 have been rejected. In response, claims 1-5, 9-11, 15-17, 20, 21, 23-25, 28-33, 37-39, 43, and 56 have been amended and no claims have been cancelled. Accordingly, claims 1-43 and 56 remain pending in the application.

Claim Amendments

Support for the amendments to claims 1-5, 9-11, 15-17, 20, 21, 23-25, 28-33, 37-39, 43, and 56 may be found at least in Figures 1 and 3 and in paragraphs 18 and 24-26 of Applicant's Specification.

Claim Objections

In item 2 on page 2, the Examiner objects to an informality in claim 23. In response, Applicant has amended claim 23, obviating the objection.

Claim Rejections under 35 U.S.C. §101

In item 4 on page 2, the Examiner rejects claims 29-43 as being directed to non-statutory subject matter. More specifically, the Examiner states that the instructions must be stored on a storage medium and executed by a computer element. Applicant respectfully submits that the Examiner mistates the law. While executable instructions must be stored on a computer-readable storage medium, they need not actually be recited as being executed. The applicable case is *In re Beauregard*, 53 F.3d 1583 (Fed. Cir. 1995). In that case, the Federal Circuit held that a computer-readable storage medium storing a set of instructions capable of causing a computer to perform a process is statutory subject matter under §101. Applicant respectfully submits that claims 29-43 recite just such storage mediums and instructions, and are thus statutory subject matter under §101.

Claim Rejections under 35 U.S.C. §103(a)

On page 7 item 3 of the above-identified Office Action, the Examiner rejects claims 1-43 and 56 as being unpatentable over U.S. Patent Publication No. 2003/0200457 to *Auslander et al* (hereinafter "Auslander") in view of U.S. Patent No. 6,578,033 to *Singhal et al* (hereinafter "Singhal") under §103.

More specifically, in rejecting claim 1, the Examiner cited paragraphs 20 and 22 of Auslander. These passages describe a method for managing access to a lock by a plurality of threads by associating the lock and each thread attempting to access the lock with a pointer structure. The pointer structure of the lock has a head pointer to a first thread in a queue waiting to access the lock and a tail pointer to the last thread in the queue. When the lock is released by a thread, the head pointer of the lock is not reset until the first thread in the queue has acquired the lock. By waiting until the first queued thread has acquired the lock to reset the head pointer, the method of Auslander ensures that the first queued thread, not some other thread happening to try to acquire the lock at the right moment, will in fact acquire the lock. Also, the lock of Auslander has three states (lock not acquired; lock acquired, no one waiting; and lock acquired, one or more threads waiting) which correspond to various head and tail pointer settings of the lock.

The Examiner, however, admits that Auslander fails to disclose all of the elements of claim 1, and cites Figure 7 and col. 5, line 14 of Singhal as curing the deficiency. That figure and passage disclose a lock having four states. Those states are described in greater detail in col. 10, lines 1-10. They include a first state in which the lock has not been acquired, a second state in which the lock has been acquired, but no threads are waiting, a third state in which the lock has been acquired and one thread is waiting, and a fourth state in which the lock has been acquired and two threads are waiting. The first waiting thread spins at the lock at the highest rate, and the second thread spins at the lock at a second, slightly lower rate. Because order of access is managed by the speed at which the waiting threads spin, no queue is needed. Also, as mentioned on col. 10, lines 8-9, the lock stores a single value representing the state of the lock.

In response to the Examiner's rejections, Applicant has amended claim 1 to recite, in part:

"asynchronously querying and receiving a first state of the lock as a current state of the lock by the thread, the lock being considered to be in any one of at least four states in any point in time, the states defined by a state machine associated with the lock;

speculatively determining by the thread, a second state of the lock based at least in part on the first state and the selected action; and

attempting to perform by the thread, the selected action to transition the lock from the first state to the speculatively determined second state, the attempting including determining if the first state remains the current state of the lock, and, if the first state remains the current state, performing the selected action to transition the current state of the lock to the second state."

In contrast, Auslander and Singhal do not teach or suggest that acquiring, attempting to acquire, or releasing the lock includes "determining if the first state remains the current state of the lock, and, if the first state remains the current state, performing the selected action to transition the current state of the lock to the second state." In fact, for the reasons mentioned in detail above, Auslander and Singhal teach away from such determining and conditional transitioning. In Auslander, the state can only be transitioned when the acquiring thread has completed its acquisition of the lock. Because the state cannot change between querying of the state of the lock and attempting to acquire it, there is no reason, when attempting to acquire the lock, to check if the queried state has since changed.

Further, in paragraph 22, Auslander explicitly criticizes all solutions that allow the state of the lock to change between a previous thread releasing it and a current thread acquiring it, noting that such solutions may allow out of order advancement. The method of claim 1 is exactly such a solution, allowing the state of the lock to change between querying the current state of the lock and subsequently attempting to perform an action to transition the state of the lock. While claim 1 performs the conditional transitioning to overcome the problems discussed in Auslander, one skilled in the art

nonetheless would not modify Auslander to perform the operations of claim 1, since Auslander explicitly teaches away from exactly such operations.

Also, nothing in Auslander and Singhal remotely suggests the state machine associated with the lock defined by claim 1. State machines are well known in the art, and nothing in either reference resembles such a state machine.

Accordingly, amended claim 1 is patentable over Auslander and Singhal under §103.

Claims 16, 23, and 29 include similar recitations directed to apparatuses and articles of claim 1, Accordingly, for at least the same reasons, claims 16, 23, and 29 are patentable over Auslander and Singhal under §103.

Claims 2-15, 17-22, 24-28, 30-43, and 56 depend from claims 1, 16, 23, and 29, incorporating their recitations. Accordingly, for at least the same reasons, claims 2-15, 17-22, 24-28, 30-43, and 56 are patentable over Auslander and Singhal under §103.

Additionally, claims 2, 7, 17, 18, 24, 30, and 35 all discuss actions taken if the state transition fails. The Examiner cites paragraph 22 as teaching all of the recitations of these claims. As discussed above, however, Auslander and Singhal do not allow state transitions to fail by preventing the transitioning of the state of the lock until after the new thread has acquired it. Thus, because Auslander and Singhal do not teach or suggest the failing of state transitions, much less actions taken based on those failures, claims 2, 7, 17, 18, 24, 30, and 35 are patentable over Auslander and Singhal.

Conclusion

In conclusion, claims 1-43 and 56 are in condition for allowance. Early issuance of Notice of Allowance is respectfully requested.

The Commissioner is hereby authorized to charge shortages or credit overpayments to Deposit Account No. 500393.

Respectfully submitted,

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